

# PATENT ABSTRACTS OF JAPAN

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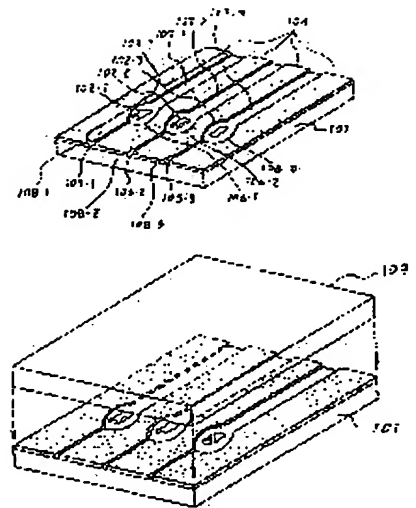
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## (54) INK JET RECORDING HEAD

### (57)Abstract:

**PURPOSE:** To obtain an ink jet recording head which is inexpensive, small in size and high in reliability, by defining a plurality of ink passages by wall parts constituted of a hardened layer of a photosensitive resin and a cover member, on a substrate, providing thermal energy generating elements, and setting the spacing between the wall parts to be narrower on the discharge port side than at an operating part in each of the ink passages.

**CONSTITUTION:** A predetermined number of thermal energy generating elements 102 are stationarily provided at predetermined positions on a substrate 101. Ink passage grooves 103 are defined by wall parts constituted of a hardened layer of a photosensitive resin on the substrate, the spacing between the wall parts being set to be narrower on the side of an ink discharging part 108 than at an operating part 106 in each of the ink passages. Since the wall surfaces are smooth and energy for ejection is effectively transmitted to the side of ejecting ports 105, the ejecting energy generated by the elements 102 can be effectively led to the side of the ejecting port 105. An upper cover 109 is adhered to the substrate 101 on the side of the elements 102 to produce an ink jet recording head.



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(A) Relevance to claims

The following is a translation of passages related to claims 1-18 of the present invention.

(B) Translation of the relevant passages

[Detailed Description of the Invention]

The following will provide further details of the present invention with reference to figures.

Figs. 1(a), 1(b), and 1(c) are schematic views for describing a structure of an ink jet recording head of the present invention.

At a predetermined position of a substrate 101 made of ceramics such as alumina, metal, plastic, and so forth, drive elements 102 such as a heating element for energizing a liquid (ink) to turn to be a droplet and a piezoelectric element are fixed. The number of the drive elements 102 is determined in advance (3 in the figure). Electrodes for supplying electric signal to the drive elements 102, which are not illustrated in the figure, may

be formed in advance in accordance with a predetermined method, formed at the same time as the formation of the drive elements 102, or formed after forming below-mentioned grooves.

On that surface of the substrate 101 which is provided with the drive elements 102, a photosensitive formation later 104 having a predetermined thickness is provided by a method such as applying and laminating.

Subsequently, by a typical photolithography, orifice sections 105, process sections 106, ink supply path sections 107, and ink flow grooves 103 for forming ink flow paths such as ink discharging path sections 108 are formed. Then, on the drive element side of the substrate 101 where the ink flow grooves 103 are formed, a top cover 109 is provided, so that the manufacture of the ink jet recording head of the present invention is completed. Now, the advantages of the manufacture of the ink jet recording head of the present invention are as follows: (i) unlike conventional arts, it is unnecessary to precisely align the substrate 101 with the top cover 109; (ii) since inner walls of the ink flow paths are flat, a liquid smoothly flows and a droplet is discharged without hindrance; and (iii) since high-density micro-fabrication is realized with ease, a high-density multi-orifice recording

head with good characteristics is manufactured with low costs and good process yield. Moreover, the recording head thus manufactured excels in a droplet discharging efficiency, an energy-saving ratio, stability of the droplet, and uniformity of the discharging, and also is small in size and requires low manufacturing costs.